

CLAIMS

What is claimed is:

1. A bone preparation device, comprising:
 - a guide body;
 - a bone removal device having a longitudinal axis extending between a proximal portion and a distal portion;
 - a pair of guide members movably engaged between said guide body and said bone removal device; and
 - an alignment device movably engaged between said guide members, wherein said bone removal device may be movably guided by said guide members and said alignment device with respect to said guide body through a predetermined pattern.
2. The bone preparation device of claim 1, wherein said guide members are rotatably connected to said bone removal device.
3. The bone preparation device of claim 2, wherein said guide members are pivotally connected to said bone removal device.
4. The bone preparation device of claim 1, wherein said predetermined pattern is circular.
5. The bone preparation device of claim 4, wherein said bone removal device forms a generally toroidal shape in the bone.
6. The bone preparation device of claim 1, wherein each of said guide members has a major side surface substantially parallel to said longitudinal axis and each of said guide members is joined to said major side surface.
7. The bone preparation device of claim 6, wherein said predetermined pattern is defined in a plane substantially parallel to said longitudinal axis.
8. The bone preparation device of claim 1, wherein each of said guide members is rotationally connected to said guide body and rotationally connected to said bone removal device.

9. The bone preparation device of claim 1, wherein said guide body is a cage at least partially encircling said bone removal device.
10. The bone preparation device of claim 9, wherein said body has an inner surface, said inner surface having at least one track, said guide members following said at least one track to control said bone removal device to form said predetermined pattern.
11. The bone preparation device of claim 10, wherein said guide members are pivotally connected to said bone removal device.
12. The bone preparation device of claim 1, wherein each of said guide members includes a first projection pivotally engaged to said bone removal device.
13. The bone preparation device of claim 12, wherein each of said guide members includes a second projection in substantial opposition to said first projection, said second projection pivotally engaged with said guide body.
14. The bone preparation device of claim 1, wherein said bone removal device includes a bone removal element disposed adjacent said distal end, said bone removal element having an axis of rotation, said axis of rotation offset with respect to said longitudinal axis.
15. The bone preparation device of claim 14, wherein said axis of rotation is substantially transverse to said longitudinal axis.
16. The bone preparation device of claim 1, wherein said bone removal device is coupled to a power source adjacent said proximal end.
17. The bone preparation device of claim 1, wherein said guide members are configured to simultaneously control axial displacement of said bone removal device with respect to said guide body and movement transverse to said longitudinal axis to generate a substantially non-linear predetermined pattern.
18. The bone preparation device of claim 1, wherein said alignment device controls the speed and direction of said guide members.

19. The bone preparation device of claim 1, wherein said alignment device comprises a gear.
20. The bone preparation device of claim 1, wherein said alignment device comprises a connecting rod.
21. The bone preparation device of claim 1, wherein said alignment device comprises a band connected between a pair of pulleys, wherein each pulley is connected to a respective guide member.
22. The bone preparation device of claim 1, wherein said alignment device is adapted to move each guide member at approximately the same speed.
23. The bone preparation device of claim 1, wherein said alignment device is adapted to move each guide member in approximately the same direction
24. The bone preparation device of claim 1, wherein said alignment device is positioned within said guide body.
25. A method of bone preparation, the method comprising:
 - moving a bone removal device at least partially housed within a guide body, wherein a pair of guide members are movably engaged between the guide body and the bone removal device and rotate with the movement of the bone removal device;
 - guiding the movement of the bone removal device through a predetermined pattern;
 - aligning the rotation of the guide members with an alignment device movably engaged between the guide members.
26. The bone preparation method of claim 25 wherein the alignment device comprises a gear.
27. The bone preparation method of claim 25 wherein the alignment device comprises a connecting rod.

28. The bone preparation method of claim 25 wherein the alignment device comprises a band connected between a pair of pulleys, wherein each pulley is connected to a respective guide member.

29. The bone preparation method of claim 25 wherein the alignment device is adapted to move each guide member at approximately the same speed.

30. The bone preparation method of claim 25 wherein the alignment device is adapted to move each guide member in approximately the same direction.

31. A vertebral body preparation device, comprising:

a guide body;

a bone removal device having a longitudinal axis extending between a proximal portion and a distal portion;

a pair of guide members movably engaged between said guide body and said bone removal device; and

an alignment device movably engaged between said guide members, wherein said bone removal device may be movably guided by said guide members and said alignment device with respect to said guide body through a predetermined pattern.

32. The vertebral body preparation device of claim 31, wherein said alignment device controls the speed and direction of said guide members.

33. The vertebral body preparation device of claim 31, wherein said alignment device comprises a gear.

34. The vertebral body preparation device of claim 31, wherein said alignment device comprises a connecting rod.

35. The vertebral body preparation device of claim 31, wherein said alignment device comprises a band connected between a pair of pulleys, wherein each pulley is connected to a respective guide member.